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THAT WHICH IS CLAIMED:

1. A method of transmitting, from at least two antennas, a signal formed of a sequence of multidimensional points and having coding redundancy, said method comprising the steps of:

using a first set of multidimensional points, whereby each multidimensional point in said first set is capable of conveying a predefined number of bits over a specified number of channel uses, such that a signal with no coding redundancy and formed of said first set of multidimensional points exhibits a spectral efficiency of a predetermined number of bits per channel use, and wherein said first set of multidimensional points forms an initial multidimensional constellation; and

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expanding said initial multidimensional constellation to create an expanded multidimensional constellation in order to enable transmission of a signal with coding redundancy without reducing the spectral efficiency of said signal, wherein the expanded multidimensional constellation is formed of a second set of multidimensional points, whereby each multidimensional point in said second set is capable of conveying a predefined number of bits over a specified number of channel uses, such that a signal with coding redundancy and formed of said second set of multidimensional points exhibits the same spectral efficiency as said signal with no coding redundancy and formed of said first set of multidimensional points, and wherein said second set of multidimensional points defines a shape in a relevant multidimensional space of the expanded multidimensional constellation, said shape being preserved, except for multiplication by a scaling factor, when subject to instantaneous realizations of multiplicative distortions during transmission of said signal over a fading channel.

2. The method of Claim 1, wherein the initial multidimensional constellation is orthogonal.

3. The method of Claim 1, wherein the initial multidimensional constellation is expanded by multiplying the initial multidimensional constellation by a unitary matrix U to generate the expanded multidimensional constellation.

4. The method of Claim 1, wherein each of the multidimensional points forming said expanded multidimensional constellation is positioned at a distance and at an angle with respect to the other multidimensional points forming said expanded multidimensional constellation, such that a combination of the distance and angle of each multidimensional point with respect to all other multidimensional points forming said expanded multidimensional constellation makes up a set of distance and angle pairs that defines the shape of the expanded multidimensional constellation.

5. The method of Claim 4, wherein said set of distance and angle pairs is the same for each constellation point within said expanded multidimensional constellation.

6. The method of Claim 1, wherein each multidimensional point is represented by a matrix comprising one or more values, said one or more values representing one or more dimensions of the multidimensional point, which correspond to one or more dimensions in which said predefined number of bits associated with said multidimensional point will be transmitted.

7. The method of Claim 6, wherein the one or more dimensions of the multidimensional point include one or more of space, time and frequency.

8. The method of Claim 6, wherein the one or more values representing one or more dimensions are complex in nature.

9. A method of constructing a multidimensional constellation, said method comprising the steps of:

providing an initial multidimensional constellation formed of a first set of multidimensional points, each of said first set of multidimensional points capable of conveying a predefined number of bits over a specified number of channel uses, such that a first signal with no coding redundancy and formed of said first set of multidimensional points exhibits a spectral efficiency of a predetermined number of bits per channel use; and

expanding the initial multidimensional constellation to form an expanded multidimensional constellation formed of a second set of multidimensional points, each of said second set of multidimensional points capable of conveying a predefined number of bits over a specified number of channel uses, such that a second signal with coding redundancy and formed of said second set of multidimensional points exhibits the same spectral efficiency as said first signal with no coding redundancy and formed of said first set of multidimensional points, wherein said second set of multidimensional points defines a shape in a relevant multidimensional space of said expanded multidimensional constellation, said shape capable of being preserved, except for multiplication by a scaling factor, when subject to instantaneous realizations of multiplicative distortions during a transmission of said second signal over a fading channel.

10. The method of constructing a multidimensional constellation of Claim 9, wherein the step of expanding the multidimensional constellation comprises multiplying the initial multidimensional constellation by a unitary matrix U to generate the expanded multidimensional constellation.

11. The method of constructing a multidimensional constellation of Claim 9, wherein each of the multidimensional points in said second set of multidimensional points is positioned at a distance and at an angle with respect to the other multidimensional points in said second set of multidimensional points, such that a combination of the distance and angle of each multidimensional point with respect to all other multidimensional points in said second set of multidimensional points makes up a set of distance and angle pairs that defines the shape of the expanded multidimensional constellation.

12. The method of constructing a multidimensional constellation of Claim 11, wherein said set of distance and angle pairs is the same for each multidimensional point within said second set of multidimensional points.

13. The method of constructing a multidimensional constellation of Claim 9, wherein each constellation point of said initial and expanded multidimensional constellations is represented by a matrix comprising one or more values, said one or more values representing one or more dimensions of the multidimensional point, which correspond to one or more dimensions in which said predefined number of bits associated with said multidimensional point will be transmitted.

14. The method of constructing a multidimensional constellation of Claim 13, wherein the one or more dimensions of the multidimensional point include one or more of space, time and frequency.

15. An apparatus for transmitting, from at least two antennas, a signal formed of a sequence of multidimensional points and having coding redundancy, said apparatus comprising:

a data source configured to provide data to be transmitted by the signal, wherein the data comprises a first set of bits capable of being conveyed by a first set of multidimensional points, whereby each multidimensional point in said first set is capable of conveying a predefined number of bits over a specified number of channel uses, such that a signal formed of said first set of multidimensional points exhibits a spectral efficiency of a predetermined number of bits per channel use, and wherein said first set of multidimensional points forms an initial multidimensional constellation;

a channel encoder configured to receive the first set of bits from the data source and to introduce coding redundancy to the first set of bits, wherein an output of the channel encoder is a second set of encoded bits, said second set being larger than said first set; and

a modulator configured to receive said second set of encoded bits and to map said second set of encoded bits to a second set of multidimensional points, whereby each multidimensional point in said second set is capable of conveying a predefined number of encoded bits over a specified number of channel uses, such that a signal formed of said second set of multidimensional points exhibits the same spectral efficiency as said signal formed of said first set of multidimensional points, wherein said second set of multidimensional points forms an expanded multidimensional constellation, said expanded multidimensional constellation having a shape in a relevant multidimensional space that is defined by said second set of multidimensional points and is preserved, except for multiplication by a scaling factor, when subject to instantaneous realizations of multiplicative distortions during transmission of said signal over a fading channel.

16. The apparatus of Claim 15, wherein the shape of the initial multidimensional constellation is defined by a combination of distances and angles between multidimensional points in the first set of multidimensional points, and wherein the shape of the expanded multidimensional constellation is defined by a combination of distances and angles between multidimensional points in the second set of multidimensional points.

17. The apparatus of Claim 15, wherein said expanded multidimensional constellation is created by multiplying said initial multidimensional constellation by a unitary matrix U.

18. The apparatus of Claim 15, wherein each multidimensional point of the initial and expanded multidimensional constellations is represented by a matrix comprising one or more values representing one or more dimensions of the corresponding multidimensional point, said one or dimensions of the multidimensional point representing one or more dimensions in which said predefined number of bits associated with said multidimensional point will be transmitted.

19. The apparatus of Claim 18, wherein the one or more dimensions of the multidimensional point include one or more of space, time and frequency.

20. The apparatus of Claim 18, wherein the one or more values representing one or more dimensions are complex in nature.

21. The apparatus of Claim 15, wherein the channel encoder and the modulator are one element.

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application.

LISTING OF CLAIMS:

1-32 (Canceled).

33. (Currently amended) A method of transmitting information comprising the steps of:

receiving an information signal;

receiving a plurality of coefficients from a remote communication system;

averaging ~~at least one~~ less than four of the coefficients over a plurality of slots;

producing a plurality of weighted information signals from respective coefficients and the information signal; and

transmitting the plurality of weighted information signals from respective antennas.

34. (Previously presented) A method as in claim 33, comprising the steps of:

encoding the information signal;

interleaving the information signal;

symbol mapping the information signal; and

modulating the information signal.

35. (Previously presented) A method as in claim 33, wherein the step of producing a plurality of weighted information signals comprises the steps of:

multiplying the information signal by a first coefficient, thereby producing a first weighted information signal; and

multiplying the information signal by a second coefficient, thereby producing a second weighted information signal.

36. (Previously presented) A method as in claim 35 comprising the steps of:

transmitting the first weighted information signal from a first antenna; and

transmitting the second weighted information signal from a second antenna.

37. (Previously presented) A method as in claim 35, wherein the respective coefficients correspond respectively to previously transmitted weighted information signals.

38. (Previously presented) A method as in claim 35 comprising the steps of:

transmitting a first set of pilot symbols over a primary common control physical channel (PCCPCH); and

transmitting a second set of pilot symbols and the weighted information signals over a dedicated physical channel (DPCH).

Please add the following new claims:

39. (New) An apparatus, comprising:

circuitry for receiving an information signal;

circuitry for receiving a plurality of coefficients from a remote communication system;

circuitry for averaging less than four of the coefficients over a plurality of slots;

producing a plurality of weighted information signals from respective coefficients and the information signal; and

transmitting the plurality of weighted information signals from respective antennas.

40. (New) The apparatus of Claim 39, further comprising:

circuitry encoding the information signal;

circuitry for interleaving the information signal;

circuitry for symbol mapping the information signal; and

circuitry for modulating the information signal.

41. (New) The apparatus of Claim 39, further comprising:

circuitry for multiplying the information signal by a first coefficient, thereby producing a first weighted information signal; and

circuitry for multiplying the information signal by a second coefficient, thereby producing a second weighted information signal.

42. (New) The apparatus of Claim 42, further comprising:

circuitry for transmitting the first weighted information signal from a first antenna; and

circuitry for transmitting the second weighted information signal from a second antenna.

43. (New) The apparatus of Claim 41, wherein the respective coefficients correspond respectively to previously transmitted weighted information signals.

44. (New) The apparatus of Claim 41, further comprising:

circuitry for transmitting a first set of pilot symbols over a primary common control physical channel (PCCPCH); and

circuitry for transmitting a second set of pilot symbols and the weighted information signals over a dedicated physical channel (DPCH).

45. (New) The apparatus of Claim 39, wherein less than four is two.

46. (New) The method as in Claim 33, wherein less than four is two.